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DEC 9 '20 RCV'D



RADIOLOGICAL SURVEILLANCE
OF
FLORIDA POWER AND LIGHT COMPANY

ST. LUCIE PLANT

THIRD QUARTER 2020

BUREAU OF RADIATION CONTROL

ST. LUCIE SITE

Offsite Dose Calculation Manual Sampling

Third Quarter, 2020

Sample Type	Collection Frequency	Number of Sample Locations	Number of Samples
1. Direct Radiation	Quarterly	27	25
2. Airborne			
2.a. Air Iodines	Weekly	5	65
2.b. Air Particulates	Weekly	5	65
3. Waterborne			
3.a. Surface Water	Weekly	1	13
	Monthly	1	3
3.b. Shoreline Sediment	Semiannually	2	2
4. Ingestion			
4.a. Fish and Invertebrates			
4.a.1. Crustacea	Semiannually	2	0
4.a.2. Fish	Semiannually	2	0
4.b. Broadleaf Vegetation	Monthly	3	9
			Total: 182

NOTE: Measurement results having magnitudes that are significantly above the background of the measurement system are reported as net values plus or minus a one-standard-deviation error term. Measurement results that are not significantly above background are reported as less than a Lower Limit of Detection (<LLD), which is an estimated upper limit (with at least 95% confidence) for the true activity in the sample.

The marine fauna listed in this report were collected in part, under Florida FWC SAL030.

1. DIRECT RADIATION - DEPLOYED TLD's - (μ R/hour)

Sample Site	Deployment Collection	16-Jun-20 22-Sep-20	Sample Site	Deployment Collection	16-Jun-20 22-Sep-20
N-1		3.15 ± 0.17	SW-2		3.28 ± 0.05
NNW-5		3.07 ± 0.58	SW-5		4.04 ± 0.30
NNW-10		3.99 ± 0.47	SW-10		3.24 ± 0.41
NW-5		2.98 ± 0.66	SSW-2		3.37 ± 0.05
NW-10		4.36 ± 0.41	SSW-5		3.80 ± 0.15
WNW-2		3.37 ± 0.40	SSW-10		2.83 ± 0.61
WNW-5		3.44 ± 1.15	S-5		3.28 ± 0.55
WNW-10	(A)		S-10		3.38 ± 0.25
W-2		3.28 ± 0.15	S/SSE-10		3.86 ± 0.25
W-5		3.64 ± 0.49	SSE-5		3.38 ± 0.46
W-10		2.98 ± 0.36	SSE-10	(A)	
WSW-2		3.29 ± 0.58	SE-1		3.26 ± 0.38
WSW-5		3.36 ± 0.13	H-32		3.89 ± 0.27
WSW-10		3.16 ± 0.42			

(A) TLD could not be located at time of collection.

2.a. IODINE-131 IN WEEKLY AIR CARTRIDGES - (pCi/ m³)

Collection Date	H08	H12	H14	H30	H34
06-Jul-20	<0.03	<0.03	<0.03	<0.03	<0.03
14-Jul-20	<0.01	<0.01	<0.01	<0.01	<0.01
21-Jul-20	<0.02	<0.02	<0.02	<0.02	<0.02
28-Jul-20	<0.02	<0.02	<0.02	<0.02	<0.02
04-Aug-20	<0.02	<0.02	<0.02	<0.02	<0.02
11-Aug-20	<0.02	<0.02	<0.02	<0.02	<0.02
18-Aug-20	<0.02	<0.02	<0.02	<0.02	<0.02
25-Aug-20	<0.02	<0.02	<0.02	<0.02	<0.02
01-Sep-20	<0.02	<0.02	<0.02	<0.02	<0.02
09-Sep-20	<0.02	<0.02	<0.02	<0.02	<0.02
15-Sep-20	<0.02	<0.02	<0.02	<0.02	<0.02
22-Sep-20	<0.02	<0.02	<0.02	<0.02	<0.02
30-Sep-20	<0.02	<0.02	<0.02	<0.02	<0.02

2.b.1. AIR PARTICULATES - GROSS BETA - (pCi/m³)

Collection Date	H08	H12	H14	H30	H34
06-Jul-20	0.013 ± 0.002	0.011 ± 0.002	0.018 ± 0.002	0.013 ± 0.002	0.008 ± 0.002
14-Jul-20	0.017 ± 0.002	0.014 ± 0.002	0.017 ± 0.002	0.020 ± 0.002	0.015 ± 0.002
21-Jul-20	0.014 ± 0.002	0.017 ± 0.002	0.016 ± 0.002	0.012 ± 0.002	0.010 ± 0.002
28-Jul-20	0.010 ± 0.002	0.009 ± 0.002	0.009 ± 0.002	0.006 ± 0.002	0.008 ± 0.002
04-Aug-20	0.011 ± 0.002	0.016 ± 0.002	0.018 ± 0.002	0.012 ± 0.002	0.008 ± 0.002
11-Aug-20	0.013 ± 0.002	0.011 ± 0.002	0.007 ± 0.002	0.009 ± 0.002	0.006 ± 0.002
18-Aug-20	0.011 ± 0.002	0.011 ± 0.002	0.011 ± 0.002	0.010 ± 0.002	0.007 ± 0.002
25-Aug-20	0.007 ± 0.002	0.016 ± 0.002	0.013 ± 0.002	0.013 ± 0.002	0.007 ± 0.002
01-Sep-20	0.008 ± 0.002	0.006 ± 0.002	0.008 ± 0.002	0.010 ± 0.002	<0.007
09-Sep-20	0.013 ± 0.002	0.018 ± 0.002	0.016 ± 0.002	0.024 ± 0.002	0.012 ± 0.002
15-Sep-20	<0.009	0.006 ± 0.002	0.009 ± 0.002	0.007 ± 0.002	0.004 ± 0.002
22-Sep-20	0.008 ± 0.002	0.010 ± 0.002	0.006 ± 0.002	0.009 ± 0.002	0.006 ± 0.002
30-Sep-20	0.008 ± 0.002	0.008 ± 0.002	0.011 ± 0.002	0.009 ± 0.002	0.008 ± 0.002
Average:	<0.011	0.012 ± 0.001	0.012 ± 0.001	0.012 ± 0.001	<0.008

2.b.2. AIR PARTICULATES - GAMMA ANALYSIS OF QUARTERLY COMPOSITES - (pCi/m³)

Sample Site	Be-7	K-40	Cs-134	Cs-137	Pb-210
H08	0.0893 ± 0.0069	<0.0197	<0.0008	<0.0007	0.0116 ± 0.0024
H12	0.1100 ± 0.0085	<0.0133	<0.0013	<0.0008	<0.0145
H14	0.1030 ± 0.0072	<0.0198	<0.0008	<0.0008	0.0095 ± 0.0029
H30	0.1340 ± 0.0097	<0.0250	<0.0013	<0.0011	<0.0094
H34	0.0899 ± 0.0088	<0.0241	<0.0013	<0.0010	<0.0087

3.a. SURFACE WATER - (pCi/L)

Sample Site	Collection Date	H-3	K-40	Mn-54	Co-58	Fe-59	Co-60	Zn-65	(A)	Zr-95	Nb-95	I-131	Cs-134	Cs-137	Ba-140 (B)
H15	06-Jul-20	<142	365 ± 27	<3	<4	<7	<3	<8	<5	<4	<4	<4	<4	<4	<4
	14-Jul-20	<139	377 ± 27	<3	<3	<7	<3	<7	<6	<4	<4	<4	<4	<4	<4
	21-Jul-20	<137	328 ± 25	<4	<3	<7	<4	<7	<6	<5	<3	<4	<5	<5	<5
	28-Jul-20	<137	319 ± 26	<3	<4	<7	<4	<7	<6	<4	<3	<3	<3	<3	<4
	04-Aug-20	<139	354 ± 27	<3	<3	<8	<3	<7	<6	<4	<4	<4	<4	<4	<4
	11-Aug-20	<139	356 ± 26	<3	<3	<8	<4	<7	<7	<4	<3	<4	<4	<4	<4
	18-Aug-20	<141	338 ± 27	<4	<4	<8	<4	<8	<6	<4	<3	<4	<4	<4	<4
	25-Aug-20	<141	346 ± 26	<4	<3	<6	<3	<7	<5	<4	<3	<4	<4	<4	<4
	01-Sep-20	<139	332 ± 25	<4	<3	<7	<3	<7	<6	<4	<3	<4	<4	<4	<4
	09-Sep-20	<139	334 ± 25	<3	<3	<7	<4	<8	<6	<4	<3	<4	<4	<4	<4
	15-Sep-20	<139	273 ± 25	<3	<3	<7	<3	<8	<6	<3	<3	<4	<4	<4	<4
	22-Sep-20	<140	377 ± 27	<4	<4	<6	<3	<7	<6	<4	<3	<4	<4	<4	<4
	30-Sep-20	<140	300 ± 25	<3	<3	<7	<3	<6	<5	<3	<3	<4	<4	<4	<4
H59	14-Jul-20	<139	323 ± 25	<3	<4	<6	<4	<8	<7	<4	<3	<3	<3	<4	<4
	11-Aug-20	<139	345 ± 26	<3	<3	<7	<3	<7	<6	<4	<3	<4	<4	<4	<4
	15-Sep-20	<139	351 ± 26	<3	<4	<6	<4	<8	<6	<4	<3	<4	<4	<4	<4

(A) - These tabulated LLD values for Zr/Nb-95 are the higher of the individual parent or daughter LLD's.

(B) - These tabulated LLD values are for Ba-140, either based on direct measurement of Ba-140 or based on ingrowth of La-140, whichever method yields the greater sensitivity for a given sample.

3.b. SHORELINE SEDIMENT - (pCi/kg, dry weight)

Sample Site	Collection Date	Be-7	K-40	Co-58	Co-60	Cs-134	Cs-137	Pb-210	Ra-226	Th-232	U-235	U-238
H15	24-Aug-20	<76	110 ± 46	<8	<7	<8	<8	<379	<200	<69	<13	105 ± 22
H59	24-Aug-20	<88	<125	<7	<6	<7	<7	<306	<172	<63	<11	93 ± 20

4.a.1. CRUSTACEA - (pCi/kg, wet weight)

Sample Site	Collection Date	K-40	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Cs-134	Cs-137	Ra-226	Ra-228
H15											
H59											

H15 This sample not yet collected.

H59 This sample not yet collected.

4.a.2. FISH - (pCi/kg, wet weight)

Sample Site	Collection Date	K-40	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Cs-134	Cs-137	Ra-226	Ra-228
H15											
H59											

H15 This sample not yet collected.

H59 This sample not yet collected.

4.b. BROADLEAF VEGETATION - Brazilian Pepper - (pCi/kg, wet weight)

Sample Site	Collection Date	Be-7	K-40	I-131	Cs-134	Cs-137	Pb-210	Pb-212	Ra-226	Ra-228
H51	14-Jul-20	898 ± 43	4460 ± 171	<10	<7	<9	<62	<16	<189	<36
	11-Aug-20	912 ± 50	4530 ± 189	<10	<11	<11	<641	29 ± 7	<223	<52
	15-Sep-20	1060 ± 47	3530 ± 148	<8	<8	<9	<208	<16	<188	<36
H52	14-Jul-20	1140 ± 54	4380 ± 181	<12	<9	<11	<277	<19	<220	<42
	11-Aug-20	814 ± 41	3680 ± 156	<8	<9	<8	165 ± 58	17 ± 5	<201	<41
	15-Sep-20	1270 ± 62	3840 ± 167	<12	<11	<10	<621	<20	<228	<45
H59	14-Jul-20	1360 ± 71	2490 ± 138	<13	<10	<14	<852	<22	<249	<54
	11-Aug-20	1200 ± 58	2900 ± 145	<10	<11	<11	<261	<23	<237	<43
	15-Sep-20	867 ± 47	2190 ± 116	<10	<9	<11	116 ± 56	<16	<195	<35

ST. LUCIE SITE

Supplemental Sampling

Third Quarter, 2020

Sample Type	Collection Frequency	Number of Sample Locations	Number of Samples
1. Direct Radiation	Quarterly	9	9
2. Airborne			
2.a. Air Iodines	Weekly	3	39
2.b. Air Particulates	Weekly	3	39
3. Waterborne			
3.a. Surface Water	Monthly	2	6
3.b. Shoreline Sediment	Semiannually	4	4
3.c. Beach Sand	Semiannually	3	3
3.d. Ground Water	Quarterly	10	10
4. Ingestion			
4.a. Garden Crop	Annually	1	0
4.b. Citrus	Annually	1	0
			Total: 110

NOTE: Measurement results having magnitudes that are significantly above the background of the measurement system are reported as net values plus or minus a one-standard-deviation error term. Measurement results that are not significantly above background are reported as less than a Lower Limit of Detection (<LLD), which is an estimated upper limit (with at least 95% confidence) for the true activity in the sample.

1. DIRECT RADIATION - DEPLOYED TLD's - ($\mu\text{R}/\text{hour}$)

Sample Site	Deployment Collection	16-Jun-20 22-Sep-20
H08		3.96 ± 0.43
H09		4.15 ± 0.43
H12		7.51 ± 1.00
H14		4.03 ± 0.23
H33		3.90 ± 0.42
H34		3.48 ± 0.27
H60		3.47 ± 0.51
H61		4.38 ± 0.78
H62		3.73 ± 0.55

2.a. IODINE-131 IN WEEKLY AIR CARTRIDGES - (pCi/m³)

Collection Date	H09	H32	H33
06-Jul-20	<0.03	<0.03	<0.03
14-Jul-20	<0.01	<0.01	<0.01
21-Jul-20	<0.02	<0.02	<0.02
28-Jul-20	<0.02	<0.02	<0.02
04-Aug-20	<0.02	<0.02	<0.02
11-Aug-20	<0.02	<0.02	<0.02
18-Aug-20	<0.02	<0.02	<0.02
25-Aug-20	<0.02	<0.02	<0.02
01-Sep-20	<0.02	<0.02	<0.02
09-Sep-20	<0.02	<0.02	<0.02(A)
15-Sep-20	<0.02	<0.02	<0.03(B)
22-Sep-20	<0.02	<0.02	<0.01
30-Sep-20	<0.02	<0.02	<0.02

(A) No power. Estimated run time 173 out of 191 hours.

(B) Power restored 11-Sept-20 at 11:00.

2.b. AIR PARTICULATES - GROSS BETA - (pCi/m³)

Collection Date	H09	H32	H33
06-Jul-20	0.010 ± 0.002	0.013 ± 0.002	0.011 ± 0.002
14-Jul-20	0.019 ± 0.002	0.017 ± 0.002	0.015 ± 0.002
21-Jul-20	0.013 ± 0.002	0.008 ± 0.002	0.010 ± 0.002
28-Jul-20	0.009 ± 0.002	0.008 ± 0.002	0.005 ± 0.002
04-Aug-20	0.009 ± 0.002	0.014 ± 0.002	0.012 ± 0.002
11-Aug-20	0.010 ± 0.002	0.008 ± 0.002	0.006 ± 0.002
18-Aug-20	0.008 ± 0.002	0.009 ± 0.002	0.006 ± 0.002
25-Aug-20	0.015 ± 0.002	0.013 ± 0.002	0.008 ± 0.002
01-Sep-20	0.005 ± 0.002	0.011 ± 0.002	0.005 ± 0.002
09-Sep-20	0.014 ± 0.002	0.016 ± 0.002	0.021 ± 0.002(A)
15-Sep-20	<0.008	0.005 ± 0.002	0.011 ± 0.003(B)
22-Sep-20	0.009 ± 0.002	0.008 ± 0.002	0.007 ± 0.001
30-Sep-20	0.007 ± 0.002	0.010 ± 0.002	0.009 ± 0.002
Average:	<0.011	0.011 ± 0.001	0.010 ± 0.001

(A) No power. Estimated run time 173 out of 191 hours.

(B) Power restored 11-Sept-20 at 11:00.

2.b. AIR PARTICULATES - GAMMA ANALYSIS OF QUARTERLY COMPOSITES - (pCi/m³)

Sample Site	Be-7	K-40	Cs-134	Cs-137	Pb-210
H09	0.1070 ± 0.0096	<0.0255	<0.0014	<0.0010	<0.0095
H32	0.1130 ± 0.0083	<0.0136	<0.0010	<0.0009	<0.0149
H33	0.0857 ± 0.0066	<0.0183	<0.0009	<0.0007	0.0102 ± 0.0026

3.a. SURFACE WATER - (pCi/L)

Sample Site	Collection Date	<u>H-3</u>	<u>K-40</u>	<u>Mn-54</u>	<u>Co-58</u>	<u>Fe-59</u>	<u>Co-60</u>	<u>Zn-65</u>	<u>Zr-95</u> (A)	<u>Nb-95</u>	<u>I-131</u>	<u>Cs-134</u>	<u>Cs-137</u>	<u>Ba-140</u> (B)
H13	14-Jul-20	<139	268 ± 23	<3	<3	<7	<3	<7	<6	<4	<3	<3	<3	<4
	11-Aug-20	<139	304 ± 25	<3	<3	<7	<4	<7	<6	<3	<3	<3	<3	<4
	15-Sep-20	<139	277 ± 24	<4	<3	<6	<4	<9	<5	<4	<3	<4	<4	<4
H36	14-Jul-20	<139	305 ± 24	<3	<3	<6	<3	<9	<6	<4	<3	<3	<3	<4
	11-Aug-20	<139	344 ± 26	<3	<4	<7	<4	<7	<5	<3	<3	<4	<4	<4
	15-Sep-20	<139	367 ± 27	<4	<3	<8	<4	<8	<6	<4	<3	<4	<4	<4

(A) - These tabulated LLD values for Zr/Nb-95 are the higher of the individual parent or daughter LLD's.
 (B) - These tabulated LLD values are for Ba-140, either based on direct measurement of Ba-140 or based on ingrowth of La-140, whichever method yields the greater sensitivity for a given sample.

3.b. SHORELINE SEDIMENT - (pCi/kg, dry weight)

Sample Site	Collection Date	<u>Be-7</u>	<u>K-40</u>	<u>Co-58</u>	<u>Co-60</u>	<u>Cs-134</u>	<u>Cs-137</u>	<u>Pb-210</u>	<u>Ra-226</u>	<u>Th-232</u>	<u>U-235</u>	<u>U-238</u>
H13	24-Aug-20	225 ± 27	524 ± 49	<8	<7	<7	<7	<274	<278	23 ± 10	<18	<184
H16	24-Aug-20	<77	132 ± 29	<7	<6	<7	<7	<343	<229	<48	<14	<113
H19	24-Aug-20	<77	101 ± 27	<7	<6	<8	<7	<345	187 ± 72	<47	12 ± 5	60 ± 23
H36	24-Aug-20	<139	3570 ± 143	<19	1030 ± 19	<15	25 ± 5	3730 ± 288	625 ± 93	67 ± 21	39 ± 6	419 ± 27

3.c. BEACH SAND - (pCi/kg, dry weight)

Sample Site	Collection Date	Be-7	K-40	Co-58	Co-60	Cs-134	Cs-137	Pb-210	Ra-226	Th-232	U-235	U-238
H15	24-Aug-20	56 ± 24	242 ± 42	<8	<8	<8	<8	<339	199 ± 94	150 ± 20	13 ± 6	195 ± 49
H16	24-Aug-20	254 ± 28	270 ± 40	<7	<8	<7	<7	<278	<286	80 ± 15	<18	<192
H19	24-Aug-20	65 ± 30	<135	<8	<8	<7	<7	<351	<206	<65	<13	214 ± 47

3.d. GROUND WATER - (pCi/L)

Sample Site	Collection Date	<u>H-3</u>	<u>K-40</u>	<u>Mn-54</u>	<u>Co-58</u>	<u>Fe-59</u>	<u>Co-60</u>	<u>Zn-65</u>	<u>Zr-95</u> <u>Nb-95</u>	<u>I-131</u>	<u>Cs-134</u>	<u>Cs-137</u>	<u>Ba-140</u> <u>La-140</u>
H70	27-Jul-20	<137	<79	<4	<4	<8	<4	<10	<7	<5	<4	<5	<8
H71	27-Jul-20	946 ± 60	340 ± 34	<4	<4	<8	<4	<9	<6	<5	<4	<4	<8
H72	27-Jul-20	<137	315 ± 34	<4	<4	<9	<4	<10	<8	<5	<3	<4	<7
H73	27-Jul-20	<137	82 ± 13	<3	<3	<8	<4	<7	<7	<5	<4	<4	<5
H74	27-Jul-20	<137	258 ± 23	<3	<4	<7	<4	<9	<6	<5	<4	<4	<5
H75	27-Jul-20	<137	304 ± 24	<3	<3	<7	<3	<9	<6	<4	<4	<4	<4
H76	27-Jul-20	<137	<80	<4	<4	<8	<4	<9	<6	<5	<4	<4	<10
H77	27-Jul-20	<137	<75	<4	<4	<8	<4	<9	<7	<6	<4	<4	<7
H78	27-Jul-20	<137	<56	<3	<4	<8	<4	<8	<6	<6	<4	<4	<5
H79	27-Jul-20	<137	<41	<3	<3	<6	<3	<7	<6	<5	<3	<4	<5

(A) - These tabulated LLD values for Zr/Nb-95 are the higher of the individual parent or daughter LLD's.

(B) - These tabulated LLD values are for Ba-140, either based on direct measurement of Ba-140 or based on ingrowth of La-140, whichever method yields the greater sensitivity for a given sample.

4.a. GARDEN CROP - (pCi/kg, wet weight)

Sample Site	Collection Date	Be-7	K-40	I-131	Cs-134	Cs-137
H41		This sample has not been available.				

4.b. CITRUS - (pCi/kg, wet weight)

Sample Site	Collection Date	Be-7	K-40	I-131	Cs-134	Cs-137
H23		This sample previously collected.				